U.S. DEPARTMENT OF COMMERCE PATENT & TRADEMARK OFFICE

B/O Form PTO-1390 **Transmittal Letter to the United States Designated/Elected Office (DO/EO/US) Concerning a Filing Under *35 USC 371***		*Attorney's Docket Number* BROC3001/JEK
		U.S. Application Number (if known) 09/806304
International Application Number PCT/BE99/00123	*International Filing Date* 28 September 1999	*Priority Date Claimed* 29 September 1998
Title of Invention CORNER JOINT AND METHOD FOR MAKING SUCH A CORNER JOINT, AS WELL AS INFEED CORNER PIECES TO REALISE SUCH A CORNER JOINT		
Applicant(s) for DO/EO/US Alain BROCHEZ		JC07 Rec'd PCT/PTO 29 MAR 2001

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items under *35 USC 371*:

1. ☒ This is a **FIRST** submission of items concerning a filing under *35 USC 371*.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under *35 USC 371*.
3. ☒ This express request to begin national examination procedures *(35 USC 371(f))* at any time rather than delay examination until the expiration of the applicable time limit set in *35 USC 371(b)* and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed *35 USC 371(c)(2)*.
   a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☒ has been transmitted by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ A translation of the International Application into English *(35 USC 371(c)(2))*.
7. ☒ Amendments to the claims of the International Application under PCT Article 19 *(35 USC 371(c)(3))*
   a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ have been transmitted by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 *(35 USC 371(c)(3))*.
9. ☒ An oath or declaration of the inventor(s) *(35 USC 371(c)(4))*. (☒ Executed ☐ Unexecuted)
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 *(35 USC 371(c)(5))*.

Items 11 to 16 below concern other document(s) or information included:

11. ☐ An Information Disclosure Statement under *37 CFR 1.97* and *1.98*.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with *37 CFR 3.28* and *3.31* is included.
13. ☒ A **FIRST** preliminary amendment.
    ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information: 5 sheets formal drawings

Application Number (if Known) 09/806304	*International Application Number* PCT/BE99/00123	*Attorney's Docket Number* BROC3001/JEK

	Calculations	PTO USE ONLY
17. The following fees are submitted: **Basic National Fee *(37 CFR 1.492(a)(1)-(5))*:** ☒ Search report has been prepared by the EPO or JPO . . . . . $860.00 ☐ International Preliminary Examination Fee paid to USPTO *(37 CFR 1.482)* . . . . . $690.00 ☐ No International Preliminary Examination Fee paid to USPTO *(37 CFR 1.482)* but International Search Fee paid to USPTO *(37 CFR 1.445(a)(2))* . . . . . $710.00 ☐ Neither International Preliminary Examination Fee *(37 CFR 1.482)* nor International Search Fee *(37 CFR 1.445(a)(2))* paid to USPTO . . . . . $1000.00 ☐ International Preliminary Examination Fee paid to USPTO *(37 CFR 1.482)* and all claims satisfied provisions of PCT Article 33(1)-(4) $100.00		
ENTER APPROPRIATE BASIC FEE AMOUNT	**$ 860.00**	
Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date *(37 CFR 1.492(e))*.		

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total Claims	28 -20 =	8	× $18.00	$ 144.00	
Independent Claims	1 -3 =		× $80.00		
Multiple Dependent Claims (if applicable)			+ $270.00		
			TOTAL OF ABOVE CALCULATIONS	**$ 1,004.00**	
Reduction by ½ for filing by small entity, if applicable. Small Entity Status is asserted pursuant to 37 CFR 1.27 for this application.				$ 502.00	
			SUBTOTAL	**$ 502.00**	
Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date *(37 CFR 1.492(f))*.					
			TOTAL NATIONAL FEE	**$ 502.00**	
Fee for recording the enclosed assignment *(37 CFR 1.21(h))*. The assignment must be accompanied by an appropriate cover sheet *(37 CFR 3.28, 3.31)*. **$40.00** per property.					
			TOTAL FEES ENCLOSED	**$ 502.00**	
			Amount to be: Refunded:		
			Charged:		

a. ☒ A check in the amount of **$502.00** to cover the fees is enclosed.

b. ☐ Please charge my **Deposit Account Number 02-0200** in the amount of $ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to **Deposit Account Number 02-0200**. A duplicate copy of this sheet is enclosed.

Note: Where an appropriate time limit under *37 CFR 1.494* or *1.495* has not been met, a petition to revive *(37 CFR 1.137(a) or (b))* must be filed and granted to restore the application to pending status.

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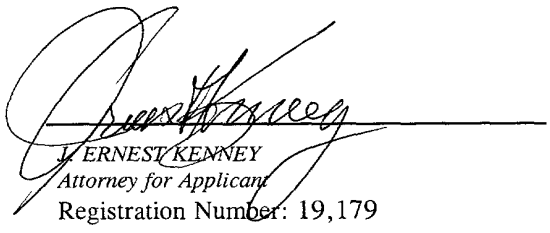
DATE: 29 March 2001

Respectfully submitted,



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PATENT

09/806304

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

International Patent Application No. PCT/BE99/00123

PCT/DO/EO/US

International Filing Date: 28 September 1999

Applicant: Alain BROCHEZ

For: CORNER JOINT AND METHOD FOR MAKING SUCH A CORNER JOINT, AS WELL AS INFEED CORNER PIECES TO REALISE SUCH A CORNER JOINT

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Sir:

This paper accompanies documents submitted to establish the U.S. national stage of the above-identified international patent application.

The claims were not amended during the international phase. Before calculation of the filing fee and before examination, please amend the application as follows:

IN THE CLAIMS:

Please amend the original as-filed claims as shown on the appended APPENDIX OF CLAIMS, which includes amended and non-amended claims. Also appended hereto is an APPENDIX OF MARKED UP CLAIMS showing the changes which have been made.

REMARKS

All rights are reserved to the original claimed subject matter. The claims have been amended to reduce the filing fees and to correct informal multiple dependent claims. Examination of the application as amended is respectfully requested.

Respectfully submitted,
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Date: March 29, 2001

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International Application No. PCT/BE99/00123 JC08 Rec'd PCT/PTO 29 MAR 2001

APPENDIX OF CLAIMS

1. Corner joint, in particular a corner joint (1) for cabinetwork which is made of hollow moulds (2-3), whereby this corner joint (1) has at least one infeed corner piece (4) with two infeed parts (5-6) extending at an angle which extend in the respective far ends of the moulds (2-3) to be joined, characterised in that it is provided with supplementary features which increase the resistance of this corner joint (1) and thus of the mitre as a whole against deformation.

2. Corner joint according to claim 1, characterised in that the supplementary features consist of the combination of at least the following characteristics:

- that the infeed corner piece (4) has a part (34) on at least one of the infeed parts (5-6) and preferably on both infeed parts (5-6) which extends through the cavity (9-10) of the accompanying mould (2-3) in an oblique manner as of the accompanying locking means (12) up to the opposite wall (33) of the cavity (9-10) in which the infeed corner piece (5-6) is situated, whereby this part (34) forms a support up to a place (P) which is situated significantly deeper in the cavity (9-10) than the above-mentioned locking means (12);
- that the infeed parts (5-6) are equipped with parts (40) which are joined together at an angle and which are each connected at their far ends to the above-mentioned accompanying oblique part (34), such that pressure created in the oblique parts (34) creates a tensile force in the first-mentioned parts (40);
- that the above-mentioned parts (40) which are joined together at an angle are situated against the inner wall (33) of the cavities (9-10) in which the infeed parts (5-6) are provided; and
- that the infeed parts (5-6) mainly have the shape of an arrow point split in the longitudinal direction, whereby the outer corner is predominantly free of any material, possibly to the exception of a number of elastically

deformable positioning parts (43-45).

3(amended). Corner joint according to claim 1, characterised in that the supplementary features consist of locking means (12) in the shape of upset material parts meshing in notches (15) in the infeed corner piece (4) as of a wall (14) of the moulds (2-3), whereby these material parts have one or several of the following characteristics:

- that an upsetting is applied which is close to the maximally admitted upsetting of the material, so as to allow for a safety margin;
- that the upsetting is selected such that it is nominally sufficiently large so as to compensate for the usual production tolerances and lacquer thicknesses on the produced semi-finished products that are taken as a basis; that an upsetting is applied whose useful working force on the total mitre can only be increased by enlarging the deposit surface increase of the upset material parts.

4(amended). Corner joint according to claim 1, characterised in that it is provided with locking means (12) consisting of upset material parts in the shape of lips (13) which are made by means of slantingly pressed-in parts of the moulds (2-3) and which co-operate with notches (15) in the infeed corner piece (4), and in that the supplementary features consist of one or several notches (15) in the infeed corner pieces (4), whereby these notches (15) have one or several and preferably all of the following characteristics:

- that they are triangular;
- that they are triangular, whereby the side (19) against which the lip (13) concerned is situated is longer than the side (20) over which the free end of the lip (13) is pressed in;
- that they have the shape of a predominantly right-angled triangle, whereby the relation between the side (19) against which the lip (13) is situated and the side (20) over which the free end of the lip (13) is

pressed in, is dictated by the compression characteristics of the material of the moulds;

- that the side (20) of the notches (15) over which the free end (21) of the lit) (13) is pressed in has a concave bent and/or buckled shape;
- that the side (20) of the notches (15) over which the free end (21) of the lip (13) is pressed in, on the place where the free end (21) of this pressed-in lip (13) makes contact with said side (20) extends perpendicular or almost perpendicular to the longitudinal direction of the pressed-in lip (13);
- that the notches (15) have a depth of 3 to 4 mm.

5(amended). Corner joint according to claim 1, characterised in that it is provided with locking means (12) consisting of one or several upset material parts in the shape of lips (13) which are made by means of slantingly pressed-in parts of the moulds (2-3), and in that the supplementary features consist at least of stop parts (23) which are situated behind the lips (13) and which allow for a pressing-on of the lips (13).

6. Corner joint according to claim 5, characterised in that this corner joint (1), and in particular the stop parts (23) have one or several of the following characteristics:

- the stop parts (23) extend in the prolongation (24) of the press-on direction (F);
- over the major part of their girth, the stop parts (23) are detached from the remaining structure of the infeed corner piece (4);
- the stop parts (23) are only connected to the rest of the infeed corner piece (4) at their base (25);
- in case of larger dimensions, the infeed corner piece (4) has a framed structure which is clearly recognisable, whereby the stop parts (23) are made thicker than the surrounding parts of the framed structure and/or

are made equally thick as the total length of the pressed-in lip (13);

- near every stop part (23) concerned, the infeed parts (5-6) of the infeed corner piece (4) are provided with a recess (30) meant for storing any possible material which has been scraped off during the pressing in of the lips (13);
- every stop part (23) concerned is carried out in relief, preferably in the shape of a serration (32) on the surface against which the lip (13) concerned is pressed; the stop parts (23) have such a shape that the formation of any possible cavities under the pressed-in lips (13) is restricted and preferably excluded;
- every stop part (23) concerned has a stop surface (31) which is inclined in relation to the longitudinal direction of the accompanying mould (2-3), with an inclination which is preferably equivalent to the inclination of the pressed-in lip (13) .

7(amended). Corner joint according to claim 4, characterised in that a filling compound is provided on the place of the pressed-in lips (13) in the shape of glue, synthetic material or such, whereby:

- this filling compound is either provided under the lip (13) so as to fill ill up any cavities under the lip (13);
- or this filling compound is provided in the passages around the lip (13), such that they are sealed off;
- or this filling compound is provided on the pressed-in lip (13) so as to entirely fill up the notch (15);
- or this filling compound provides for a combination of the above-mentioned functions.

8(amended). Corner joint according to claim 1, characterised in that, before an infeed part (5-6) is placed in a cavity (9-10) of the accompanying profile (2-3), a filling compound in the shape of glue or such is provided in this cavity (9-10).

9(amended). Corner joint according to claim 1, characterised in that it is provided with locking means (12) which operate on the outside of the moulds (2-3) concerned and which work in conjunction with the infeed corner piece (4), and in that the supplementary features at least consist in that the infeed corner piece (4) has a part (34) on at least one of the infeed parts (5-6), and preferably on both infeed parts (5-6), which extends slantingly through the cavity (9-10) of the accompanying mould (2-3) as of the accompanying locking means (12) up to opposite wall (33) of the cavity (9-10) in which the infeed corner piece (4) is situated, whereby this part (34) forms a support up to a place where it is situated significantly deeper in the cavity (9-10) than the above-mentioned locking means (12).

10. Corner joint according to claim 9, characterised in that it is part of a frame, of a window or a door, in which is provided a panel, in particular a pane of glass (16), which is fixed by means of wedges (17), characterised in that the wedges (17) are situated, preferably with their centre, in the extension (24) of the above-mentioned part (34).

11. Corner joint according to claim 9, characterised in that it is meant for a frame of a window or a door, in which a panel, in particular a pane of glass (16), is provided by fixing it by means of wedges (17), characterised in that the above-mentioned part (34) is directed such that the intersection (37) of the extension (24) thereof with the edge of the panel is situated on a distance (Z) from the corner of the panel which is in the order of magnitude of 10 cm.

12(amended). Corner joint according to claim 9, characterised in that the above-mentioned part (34) is made in the shape of a leg (26) which extends in the above-mentioned direction.

13(amended). Corner joint according to claim 9, characterised in that the locking means (12) consist of lips (13) which are pressed in slantingly and thus

provide for a tensile force, and in that these lips (13) are pressed in such that at least one of the following characteristics met:

- the free end (21) of every lip (13) concerned is situated behind the central axis (39) of the above-mentioned part (34);
- every lip (13) concerned has a direction which is slightly buckled inward in relation to the direction of the above-mentioned part (34).

14(amended). Corner joint according to claim 9, characterised in that the above-mentioned part is made in the shape of a leg (26) which is part of a triangle whose second leg (27) extends against the inside of the above-mentioned cavity (9-10) and whose third leg (29) forms a link between the first-mentioned leg (26) and the second leg (27).

15(amended). Corner joint according to claim 1, characterised in that the supplementary features at least consist of the combination of parts (40) formed on the infeed parts (5-6) which join at an angle on the one hand, and means which make it possible to create a tensile force in these parts (40).

16(amended). Corner joint according to claim 15, characterised in that the means which make it possible to create a tensile force in the above-mentioned parts (40) joining at an angle are formed of the above-mentioned oblique parts (34), which are connected to the above-mentioned parts (40) with their free ends, such that the pressure created in the oblique parts (34) creates a tensile force in the first-mentioned parts (40).

17(amended). Corner joint according to claim 15, characterised in that the above-mentioned parts (40) are situated against the inner wall (33) of the respective cavities (9-10).

18(amended). Corner joint according to claim 1, characterised in that the

above-mentioned supplementary features at least consist in that the corner joint (1) is predominantly free of parallel surfaces between the infeed corner piece (4) and the outer wall (14) of the above-mentioned cavities (9-10), to the exception of any possible zones (D1) in which locking means are mounted.

19(amended). Corner joint according to claim 1, characterised in that the above-mentioned supplementary features at least consist of a free space (42) formed on the outside corner of the infeed corner piece (4) in particular a space which is free of any massive material.

20(amended). Corner joint according to claim 1, characterised in that the infeed corner piece (4) is provided with positioning elements to force it in the right position when it is placed in the cavities (9-10).

21. Corner joint according to claim 20, characterised in that the positioning elements consist of any of the following elements:

- elastic press-on means which push the infeed parts (5-6) with their inner sides against the inner wall (33) of the above-mentioned cavities (9-10) of the moulds (2-3);
- elastically bendable flaps (43) which are provided on the infeed parts (5-6) at a distance from the corner point and which work in conjunction with the outer wall (14) of the cavities (9-10);
- support and guiding elements on the corner point, preferably in the shape of a little leg (44), provided with elastically bendable flaps (45) which work in conjunction with the outer wall (14) of the cavities (9-10) respectively.

22(amended). Corner joint according to claim 1, characterised in that the above-mentioned supplementary features at least consist of a space (46) provided in the material of the infeed corner piece (4), right behind the inside corner, without

any removal of the material part (47) of the inside corner, however, which space makes it possible to push away any burrs which may be present on the moulds, whereby the above-mentioned material part is then deformed.

23(amended). Corner joint according to claim 1, characterised in that the infeed corner piece (4) has infeed parts (5-6) made in one piece.

24(amended). Corner joint according to claim 1, characterised in that the infeed parts (5-6) are hinge-mounted in their corner point.

25. Corner joint according to claim 24, characterised in that the infeed parts (5-6) are made hook-shaped on their co-operating far ends and are connected to one another by means of a pivot (52).

26(amended). Corner joint according to claim 1, characterised in that the above-mentioned supplementary features consist of the right adjustment and/or positioning and/or combination of several of the components, such as the result of one or several measures which are taken 4, during the manufacturing process of the corner joint (1).

27(amended). Infeed corner piece for realising a corner joint according claim 1, characterised in that this infeed corner piece (4) has one or several of the characteristics which are described in the preceding claim in relation to this infeed corner piece (4).

28. Method for realising a corner joint according to claim 26, characterised in that it includes one or several of the following steps:

- the use of means which force the moulds (2-3) to assume their theoretically perfect shape before and/or after the mitre-sawing;
- in case locking means (12) are used in the shape of inwardly bent lips

(13) which are formed by pressing them in, the use of means which force the moulds (2-3) to assume their perfect shape;

- in case locking means (12) are used in the shape of inwardly bent lips (13) which are formed by pressing them in, the adjustment of the end point of the movement of the pressing knives (48), such that during the pressing, the mitre as a whole rebounds slightly.
- in case locking means (12) are used in the shape of inwardly bent lips (13) which are formed by pressing them in, the application of a filling compound or such in the notch (15) in which the lips (13) are provided, in such an amount that it is at least partially driven out during the pressing, and such that a sealing is formed on these openings, next to the lip (13).

S \Producer\jek\BROCHEZ - BROC3001\appendix of claims wpd

APPENDIX OF MARKED UP CLAIMS

3(amended). Corner joint according to claim 1 [or 2], characterised in that the supplementary features consist of locking means (12) in the shape of upset material parts meshing in notches (15) in the infeed corner piece (4) as of a wall (14) of the moulds (2-3), whereby these material parts have one or several of the following characteristics:

- that an upsetting is applied which is close to the maximally admitted upsetting of the material, so as to allow for a safety margin;
- that the upsetting is selected such that it is nominally sufficiently large so as to compensate for the usual production tolerances and lacquer thicknesses on the produced semi-finished products that are taken as a basis; that an upsetting is applied whose useful working force on the total mitre can only be increased by enlarging the deposit surface increase of the upset material parts.

4(amended). Corner joint according to [any of the preceding claims] claim 1, characterised in that it is provided with locking means (12) consisting of upset material parts in the shape of lips (13) which are made by means of slantingly pressed-in parts of the moulds (2-3) and which co-operate with notches (15) in the infeed corner piece (4), and in that the supplementary features consist of one or several notches (15) in the infeed corner pieces (4), whereby these notches (15) have one or several and preferably all of the following characteristics:

- that they are triangular;
- that they are triangular, whereby the side (19) against which the lip (13) concerned is situated is longer than the side (20) over which the free end of the lip (13) is pressed in;
- that they have the shape of a predominantly right-angled triangle, whereby the relation between the side (19) against which the lip (13) is situated and the side (20) over which the free end of the lip (13) is

pressed in, is dictated by the compression characteristics of the material of the moulds;

- that the side (20) of the notches (15) over which the free end (21) of the lit) (13) is pressed in has a concave bent and/or buckled shape;
- that the side (20) of the notches (15) over which the free end (21) of the lip (13) is pressed in, on the place where the free end (21) of this pressed-in lip (13) makes contact with said side (20) extends perpendicular or almost perpendicular to the longitudinal direction of the pressed-in lip (13);
- that the notches (15) have a depth of 3 to 4 mm.

5(amended). Corner joint according to [any of the preceding claims] claim 1, characterised in that it is provided with locking means (12) consisting of one or several upset material parts in the shape of lips (13) which are made by means of slantingly pressed-in parts of the moulds (2-3), and in that the supplementary features consist at least of stop parts (23) which are situated behind the lips (13) and which allow for a pressing-on of the lips (13).

7(amended). Corner joint according to [any of claims 4, 5 or 6] claim 4, characterised in that a filling compound is provided on the place of the pressed-in lips (13) in the shape of glue, synthetic material or such, whereby:

- this filling compound is either provided under the lip (13) so as to fill ill up any cavities under the lip (13);
- or this filling compound is provided in the passages around the lip (13), such that they are sealed off;
- or this filling compound is provided on the pressed-in lip (13) so as to entirely fill up the notch (15);
- or this filling compound provides for a combination of the above-mentioned functions.

8(amended). Corner joint according to [any of the preceding claims] claim 1, characterised in that, before an infeed part (5-6) is placed in a cavity (9-10) of the accompanying profile (2-3), a filling compound in the shape of glue or such is provided in this cavity (9-10).

9(amended). Corner joint according to [any of the preceding claims] claim 1, characterised in that it is provided with locking means (12) which operate on the outside of the moulds (2-3) concerned and which work in conjunction with the infeed corner piece (4), and in that the supplementary features at least consist in that the infeed corner piece (4) has a part (34) on at least one of the infeed parts (5-6), and preferably on both infeed parts (5-6), which extends slantingly through the cavity (9-10) of the accompanying mould (2-3) as of the accompanying locking means (12) up to opposite wall (33) of the cavity (9-10) in which the infeed corner piece (4) is situated, whereby this part (34) forms a support up to a place where it is situated significantly deeper in the cavity (9-10) than the above-mentioned locking means (12).

12(amended). Corner joint according to [any of claims 9, 10 or 11] claim 9, characterised in that the above-mentioned part (34) is made in the shape of a leg (26) which extends in the above-mentioned direction.

13(amended). Corner joint according to [any of claims 9 to 12] claim 9, characterised in that the locking means (12) consist of lips (13) which are pressed in slantingly and thus provide for a tensile force, and in that these lips (13) are pressed in such that at least one of the following characteristics met:

- the free end (21) of every lip (13) concerned is situated behind the central axis (39) of the above-mentioned part (34);
- every lip (13) concerned has a direction which is slightly buckled

inward in relation to the direction of the above-mentioned part (34).

14(amended). Corner joint according to [any of claims 9 to 13] claim 9, characterised in that the above-mentioned part is made in the shape of a leg (26) which is part of a triangle whose second leg (27) extends against the inside of the above-mentioned cavity (9-10) and whose third leg (29) forms a link between the first-mentioned leg (26) and the second leg (27).

15(amended). Corner joint according to [any of the preceding claims] claim 1, characterised in that the supplementary features at least consist of the combination of parts (40) formed on the infeed parts (5-6) which join at an angle on the one hand, and means which make it possible to create a tensile force in these parts (40).

16(amended). Corner joint according to claim 15 [and any of claims 9 to 14], characterised in that the means which make it possible to create a tensile force in the above-mentioned parts (40) joining at an angle are formed of the above-mentioned oblique parts (34), which are connected to the above-mentioned parts (40) with their free ends, such that the pressure created in the oblique parts (34) creates a tensile force in the first-mentioned parts (40).

17(amended). Corner joint according to claim 15 [or 16], characterised in that the above-mentioned parts (40) are situated against the inner wall (33) of the respective cavities (9-10).

18(amended). Corner joint according to [any of the preceding claims] claim 1, characterised in that the above-mentioned supplementary features at least consist in that the corner joint (1) is predominantly free of parallel surfaces between the infeed corner piece (4) and the outer wall (14) of the above-mentioned cavities (9-

10), to the exception of any possible zones (D1) in which locking means are mounted.

19(amended). Corner joint according to [any of the preceding claims] claim 1, characterised in that the above-mentioned supplementary features at least consist of a free space (42) formed on the outside corner of the infeed corner piece (4) in particular a space which is free of any massive material.

20(amended). Corner joint according to [any of the preceding claims] claim 1, characterised in that the infeed corner piece (4) is provided with positioning elements to force it in the right position when it is placed in the cavities (9-10).

22(amended). Corner joint according to [any of the preceding claims] claim 1, characterised in that the above-mentioned supplementary features at least consist of a space (46) provided in the material of the infeed corner piece (4), right behind the inside corner, without any removal of the material part (47) of the inside corner, however, which space makes it possible to push away any burrs which may be present on the moulds, whereby the above-mentioned material part is then deformed.

23(amended). Corner joint according to [any of the preceding claims] claim 1, characterised in that the infeed corner piece (4) has infeed parts (5-6) made in one piece.

24(amended). Corner joint according to [any of claims 1 to 22] claim 1, characterised in that the infeed parts (5-6) are hinge-mounted in their corner point.

26(amended). Corner joint according to [any of the preceding claims] claim 1, characterised in that the above-mentioned supplementary features consist of the

right adjustment and/or positioning and/or combination of several of the components, such as the result of one or several measures which are taken 4, during the manufacturing process of the corner joint (1).

27(amended). Infeed corner piece for realising a corner joint according [to any of the preceding claims] claim 1, characterised in that this infeed corner piece (4) has one or several of the characteristics which are described in the preceding claim in relation to this infeed corner piece (4).

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Corner joint and method for making such a corner joint, as well as infeed corner pieces to realise such a corner joint.

The present invention concerns a corner joint, a method for making such a corner joint and an infeed corner piece to realise such a corner joint in view of a significative inertia reduction of the moulds used for making frames.

In particular, it concerns a corner joint for cabinetwork which is made of hollow moulds, whereby this corner joint has at least one infeed corner piece with two infeed parts extending at an angle which extend in the respective far ends of the moulds to be joined.

In the first place, the invention is meant for making a corner joint with metal moulds, but in a more general way it can also be used, at least to a certain extent, for making corner joints with moulds made of other materials, such as PVC and such.

It is known that corner joints in frames, for example of windows and doors, which are made of hollow moulds can be realised by mitre-joining the moulds and by connecting them by means of an infeed corner piece. It is also known that such an infeed corner piece can be locked in different mechanical ways in relation to the moulds, such as by means of inwardly bent wall parts meshing in recesses in the infeed corner piece, by means of pins or by means of rotating eccentric pivots, etc.

What is important is that the mitres which are obtained in the end are sufficiently rigid, so that when the glass is

put in, and also as time passes, the frame as a whole will not hang askew and the moulds will not bend, as a result of which the frame would bulge.

It should be noted that up to now, the locking means are only used as locks with the above-mentioned techniques, without actually contributing to the rigidity and pre-stress of the obtained mitre as a whole. According to the present state of the art, the rigidity is mainly obtained thanks to the rigidity of the material of the corner joining piece in the corner itself. According to a critical, persistent misconception, it is often thought that such rigidity can be obtained by wedging up in a suitable manner, also called fastening by wedges.

The known techniques are disadvantageous in that fatigue phenomenons in the corner joining piece soon become evident in the frame hanging askew and in that the slightest setting occurring after the wedging up also results in a bending of the moulds.

The present invention aims an improved corner joint in general, and a corner joint which excludes the above-mentioned disadvantages in particular.

According to special embodiments, it also aims a corner joint which allows for the temporary fluctuation of forces while pressure is being exerted as the whole is pressed together, for the permanent fluctuation of forces as a result of the wedging up of the glass at a later stage, as well as for an optimal expulsion of the hardening locking pastes and/or filling compounds that may be supplementary used.

Also, in the first place, the invention concerns a corner joint of the type mentioned in the introduction, characterised in that it is provided with supplementary features which increase the resistance of this corner joint and of the mitre as a whole in particular against deformation, in particular the hanging askew of the frame as a whole and/or the bulging of the respective moulds.

As the corner joint is equipped with supplementary features which increase the resistance against any possible hanging askew, the rigidity of the corner no longer solely depends on the rigidity of the infeed corner piece at the height of the corner itself and of the wedging up, which has for a result that the corner joint is less subject to the above-mentioned disadvantages and that the quality of the corner joint increases.

The above-mentioned supplementary features can be of different nature according to the invention. On the one hand, these features may consist of means provided on the infeed corner piece and/or the moulds, which reinforce the corner as a whole. On the other hand, these features may also consist of means provided on the infeed corner piece and/or the moulds, which exclude disadvantageous situations, such as for example disadvantageous effects in case of frost. Further, these features may also consist of a suitable adjustment and/or positioning and/or combination of the different components, such as a result of a number of measures taken according to the invention while the corner joint is manufactured.

The different supplementary features which can be provided to the infeed corner piece itself can be either or not combined in a symbiotic manner.

According to a major preferred combination, the corner joint is characterised in that it is provided with an infeed corner piece with infeed parts which represents at least the following combination of characteristics:

- that the infeed corner piece has a part on at least one of the infeed parts and preferably on both infeed parts which extends through the cavity of the accompanying mould in an oblique manner as of the accompanying locking means up to the opposite wall of the cavity in which the infeed corner piece is situated, whereby this part forms a support up to a place which is situated significantly deeper in the cavity than the above-mentioned locking means;
- that the infeed parts are equipped with parts which are joined together at an angle and which are each connected at their far ends with the above-mentioned accompanying oblique part, such that pressure created in the oblique parts creates a tensile force in the first-mentioned parts;
- that the above-mentioned parts which are joined together at an angle are situated against the inner wall of the cavities in which the infeed parts are provided; and
- that the infeed parts mainly have the shape of an arrow point split in the longitudinal direction, whereby the outer corner is mainly free of any material, possibly to the exception of a number of elastically deformable positioning parts.

For the different embodiments of the invention, we refer to the description in the claims, as well as to the following detailed description.

The invention also concerns a method for realising the above-mentioned corner joint, whose characteristics will also become clear from the following detailed description.

In order to better explain the characteristics of the invention, the following preferred embodiments of the invention are described as an example only without being limitative in any way, with reference to the accompanying drawings, in which:

figure 1 represents a section of a corner joint according to the invention;
figure 2 represents a section to a larger scale according to line II-II in figure 1;
figure 3 represents the central part from figure 1 to a larger scale;
figures 4 and 5 represent a view to a larger scale of the parts indicated by F4 and F5 in figure 1;
figure 6 represents the infeed corner piece from figure 1 in perspective;
figure 7 represents the corner joint from figure 1 while being manufactured in the moulding machine;
figures 8 and 9 represent variants, whereby a similar corner piece is used in two different applications;
figure 10 represents the infeed corner piece from figures 8 and 9 as dismounted;
figure 11 shows a view according to arrow F11 in figure 10, whereby the parts of the infeed corner piece are connected to one another.

As represented in figures 1 to 7, the invention concerns a corner joint 1 for connecting hollow moulds 2-3 at a right angle or any other angle whatsoever, whereby the connection is realised by means of a infeed corner piece 4 which is represented more specifically in figure 6 and which has two

infeed parts 5-6 extending at an angle which are pushed in the respective far ends 7-8 of the moulds 2-3 to be connected, in particular in the cavities 9-10 provided therein.

These moulds 2 and 3 are hereby mitre-sewn in the known manner, and the aim is that, when they are mounted as represented in figure 1, they always fit up perfectly on the mitre joint, and under pre-stress according to the invention.

The mutual interlocking between the infeed corner piece 4 on the one hand and the moulds 2-3 on the other hand is carried out by means of locking means 12 which, in the example from figures 1 to 7, are each time formed of a lip 13 which consists of a pressed-in material part of the outer wall 14 which confines the cavity 9, 10 respectively and which is situated in a notch 15. It should be noted that, as will be described further as well, these locking means 12 do not necessarily have to consist of a pressed-in material part, but that they may also be formed in another manner, for example by means of a drive-in pen, a rotating eccentric pin, etc.

In the given example, the corner joint is part of a window in which is provided a pane of glass 16 which is fixed in the window by means of wedges 17. Under the wedges 17 can be provided, as represented in figure 1, a protective layer and/or insulation layer 18.

The invention is special in that the corner joint 1 is equipped with a number of supplementary features, as a result of which this corner joint 1 has been optimised in many respects in a symbiotic context; in particular it is

more resistant against deformation, not only during the wedging up of the pane of glass 16, but also afterwards.

As will become clear from the following description, different supplementary features are combined in the example represented in figures 1 to 7. It should be noted that, although such a combination is preferable, the invention also concerns embodiments in which only one or several of these features are applied.

A first feature consists in that a tensioning force is created at the height of the locking means 12 which not only provides for a locking effect, but which also creates an effective tensile force in the corner, i.e. pressure on both moulds and tension in the infeed corner piece. Thus, the invention provides for mechanical locking means generating pre-stress.

In the case where these locking means 12 consist of upset material parts, as the represented obliquely pressed-in lips 13, this is preferably realised by upsetting the material part, in this case by compressing the material of the lip 13 from a length A to a shorter length B, as indicated in figure 4, having one or several of the following characteristics:

- An upsetting which is close to the maximally admitted upsetting of the material, so as to allow for a safety margin. In order to do so, one only has to adjust the angle of inclination between the sides of the notch 15 indicated by A and B to the deformability limit of the material to be processed.
- An upsetting which is nominally sufficiently large so as to set off the usual production tolerances and lacquer thicknesses on the extruded semi-finished

products (infeed corner pieces and moulds). In order to do so, one only has to increase the upsetting, namely the difference between A and B, in case of larger production tolerances / lacquer thicknesses, reduce them respectively in case of smaller production tolerances.

- An upsetting whose useful working force on the total mitre can only be increased (optimised) by enlarging the head of the pressed-in lip. In order to be able to do so, one only has to increase the extrusion thickness of the wall from which the lip originates and/or widen the meshing knives of the moulding machine in which the lip is generated.

A second supplementary feature consists in that, in order to be able to press the above-mentioned lips 13 in, use is made of a notch 15 which has one or several and preferably all of the following characteristics:

- A notch 15 which is characterised in that it is triangular. Thus can be obtained among others that the side 19 of this triangular notch 15 is situated in the direction of or mainly in the direction of the pressed-in lip 13, whereby the creation of any free spaces between the lip 13 and the side 19 is restricted, as opposed to the known trapezoidal recesses, whereby a relatively large free space remains under the pressed-in lip. De disadvantages of such a large space, such as the fact that water can gather in it which may push the lip outward in case of frost, the fact that there can be no effective pressing and the fact that the lip can easily buckle, are minimised thanks to the use of the triangular notch 15, or even excluded. Moreover, a trapezoidal notch (with a bottom parallel to the wall to be

perforated) is also disadvantageous in that the top of the pressed-in lip has to endure all possible insertion forces and is deformed into a point when the utmost material limit is exceeded. Thus, the lip entirely loses the stress transmission on the infeed corner piece.

- A notch 15 which is a right-angle triangle, whereby the relation between the side 19 against which the lip is situated and the side 20 over which the free end 22 of the lip 13 is pressed in, just as the relation A/B and just as the acute angle between A and B, is dictated by the compression characteristics of the processed material of the mould cylinder.
- A notch 15 which is triangular, whereby the side 19 against which the lip 13 is situated is longer than the side 20 over which the free end 20 of the lip 13 is pressed in.
- A notch 15 whereby the above-mentioned side 20, as represented in figure 4, has a concave bent and/or buckled shape. This allows for differences resulting from production tolerances and lacquer thicknesses to be compensated for and moreover to realise an efficient press-on. Also, the part 22 which is situated deepest preferably extends in a direction which is rectangular or almost rectangular to the longitudinal direction of the folded lip 13, such that the lip 13 will almost certainly remain in place.
- A notch 15 having a depth D in the order of magnitude of 3 to 4 mm.

A third supplementary feature consists in that, in the case of embodiments which are equipped with obliquely pressed-in lips 13, as represented in figures 1 to 7, use is made of stop parts 23 which are situated behind the lips 13 and which allow for an efficient pressing-on with a relatively

large force. In this manner it is possible to effectively create tensile forces in the corner joint, as opposed to the known embodiments, where the pressing-in of the lips is confined by stops which only allow for a restricted press-on force.

Moreover, the corner joint 1, in particular the stop parts 23, preferably represent one or several of the following characteristics:

- The stop parts 23 extend in the prolongation 24 of the press-on direction F, such that the press-on forces are optimally absorbed.
- Over the major part of their girth, the stop parts 23 are detached from the remaining structure of the infeed corner piece 4, such that any possible deformations in the stop part 23, which are either or not temporary, cannot have a negative influence on the aimed maximal force transmissions via the remaining structure of the infeed corner piece 4.
- The stop parts 23 are only connected to the rest of the infeed corner piece 4 at their base 25, such that they are almost entirely detached from the surrounding structure.
- The infeed corner piece 4 has a framed structure, in other words it does not necessarily have a full structure, but it is built up of legs 26-27-28-29, whereby the stop parts 23 are made thicker than the surrounding parts, in particular the leg 29 of the framed structure, and/or are made equally thick as the total length of the pressed-in lip.
- Near every stop part 23 concerned, the infeed parts 5-6 of the infeed corner piece 4 are equipped with a recess 30 meant for storing any possible material which has been scraped off during the pressing in of

the lips 13. Thus is assured that no unwanted material can end up between the stop surfaces 31, which form the side 19 of the above-mentioned triangle, and the lips 13. As is represented in the figures, this recess 30 consists of a groove which also makes sure that the stop parts 23 are detached from the rest of the structure over practically their entire girth.

- Every stop part 23 concerned is carried out in relief, preferably in the shape of a serration 32. The stop surface 31 which is carried out in relief offers the advantage that a better bond is obtained for locking pastes and that the material on the stop surface 31 can be somewhat flattened, so that a too large pressure movement or angular divergence during the pressing can be compensated for without damaging the corner joint 1.

- The stop parts 23 have such a shape that the formation of cavities, to the exception of any possible small cavities formed by the serration 32, under the pressed-in lips 13 is restricted and preferably excluded for the above-mentioned reasons.

- Every stop part 23 concerned has a stop surface 31 which is inclined, equivalent to the inclination of the pressed-in lip 13.

- The basis 25 of every stop part 23 concerned is directly supported by the inner wall 33 confining the above-mentioned cavity 9, 10 respectively.

A fourth supplementary feature consists in that the infeed corner piece 4 is equipped with a part 34 defining a pressure zone between the locking means 12 on the one hand, i.e. the lips 13 in the example represented in figure 1, and a place P on the wall 33 which is situated deeper in the cavity 9, 10 respectively on the other hand, such that there can be a pressure increase between the above-

mentioned place P and the place Q of the locking means 12. As a result of this pressure increase, there will also be a pressure force in the parts 35 and 36 of the outer walls 14 between the locking means 12 and the corner point, so that these parts are pressed against one another with a force F1.

The parts 34 are in this case a fragment of the above-mentioned legs 26. By making use of legs, i.e. material parts which are detached from the environment, apart from a number of local connections, for example at their far ends, the transition of the pressure force is not influenced by the environment.

When the corner joint 1 as represented in figure 1 is part of a frame, of a window or a door, in which a panel, in particular a pane of glass 16, is provided by wedging it up by means of wedges 17, the latter will be situated in the prolongation of the above-mentioned part 34 according to the invention, preferably with their centre. In particular, the intersection 37 between the edge of the pane of glass 16 and the theoretical line 38 will be situated in the middle of the wedges 17.

Glass and window manufacturers recommend to wedge the glass up on the corners at 1/10 of the height or width of the pane of glass 16 respectively. In practice, however, the wedges 17 are usually situated with their centre at about 10 cm of the inner corner. According to a practical embodiment, the above-mentioned part 34 will then preferably also be directed such that when it is used, the above-mentioned intersection 37 will be situated more or less at a distance Z from the corner of the pane of glass 16 which is in the order of magnitude of 10 cm.

According to the practical embodiment of the invention, the lips 13 are pressed-in in such an oblique manner that at least one of the following characteristics is met:

- Every lip 13 concerned is pressed-in such that the free end 21 is situated behind the central axis 39 of the above-mentioned part 34, and better still such that the above-mentioned line 38 is situated on the inside of the central axis 39. As most of the material of the part 34 is thus situated on the outside of the line 38, the part 34 will bulge outward under a pressure load, and the side against which the lip 13 is pressed will obtain an inward inclination which partly prevents the lip 13 from protruding outward.
- Every lip 13 concerned has a direction which is bent slightly inward in relation to the direction of the above-mentioned part 34, in particular in relation to the pressure line, as a result of which the lip 13 is also prevented from protruding outward in case of a pressure increase.

In the given example, the above-mentioned part 34 is made in the shape of a leg 26 which is part of a triangle whose second leg 27 extends against the inner wall 33 and whose third leg 29 forms a link between the first-mentioned leg 26 and the second leg 27, as a result of which the position of the leg 26 is always stable.

A fifth supplementary feature consists in that the infeed parts 5-6 are equipped with parts 40 which are connected to one another at an angle and in that the corner joint 1 has means which make it possible to create a tensile force in these parts 40. In the given example of figures 1 to 6, these parts consist of legs 27-28 situated in the extension

of one another. These parts 40 integrally provide for the reactive tensile force to the compression force which occurs in both mould ends, found both on the inner mitre side and on the outer mitre side of the mould cylinders and which have been created by pushing off both moulds on the notch of the infeed corner. Under a mitre load resulting from the wedging up of the glass, these tension members 40 of the infeed corner which have been moved as close as possible to the inner mitre side prevent the inner mitre joint from ripping open, partly helped by the thus created increase of pressure forces on the mould cylinders on the outside of the mitre.

The tensile forces F2 indicated in the parts 40 in figure 1 thus result in pressure forces F1 both in the outer walls 33 as in the inner walls 14.

In the example, the means for creating a tensile force consist of the above-mentioned slanting parts 34 which are respectively linked to the accompanying free end of the part 40. The above-mentioned pressure in the parts 34 thus results in a tension in the parts 40.

Preferably, the above-mentioned parts 40 are situated against the inner wall 33 of the respective cavities 9-10, such that the tensile force is optimally transmitted to the inside corner.

A sixth supplementary feature consists in that the corner joint 1 is mainly free of parallel surfaces between the infeed corner piece 4 and the outer walls 14 which confine the cavities 9-10, to the exception of possible zones in which locking means are mounted. As is shown in figures 1 and 2, this implies that there are no essential contact surfaces between the outer walls 14 and the infeed corner

piece 4 which might freeze open. It should be noted, however, that in the case where for example drive-in pens 41 are used, as represented in figures 8 and 9, there may be a restricted parallel contact over a distance D1 formed by the zone which is required for mounting this sort of locking means.

A seventh supplementary feature consists in that a free space 42 is provided at least on the outside corner of the infeed corner piece 4, in particular a space 42 which is free of massive material, such that any compression or ripping open of the material of the tension zones which is thus weakened and thinner in the connecting corner could occur during the pressing in the moulding machine so as to compensate for possible extrusion tolerances on the rectangular shape of both parts 40.

An eighth supplementary feature consists in that the infeed corner piece 4 is provided with positioning elements to force said infeed corner piece 4 in the right position as they are provided in the cavities 9-10. In the given example, these positioning elements consist of elastically bendable flaps 43 on the one hand which are provided on the infeed parts 5-6 at a distance from the angular point and which co-operate with the outer wall 14, and of supporting and guiding elements on the angular point itself on the other hand, preferably in the shape of a little leg 44 provided with elastically bendable flaps 45 which co-operate with the outer wall 14 respectively, as represented.

It should be noted that such positioning elements according to the invention can also be made in other manners. Thus, they may for example consist of several elastic press-on means which push the infeed parts 5-6 with their inside

towards the inner wall 33. These press-on means may be part of the infeed corner piece 4 as well as of the wall 14, or they may also consist of loose elements which are provided between the infeed corner piece 4 and the wall 14. Instead of elastically bendable flaps 43, also spiral springs can be used, elastically compressible masses such as rubber, etc.

Another supplementary feature consists of a space 46 provided in the material of the infeed corner piece 4, right behind the inside corner, without the material of the inside corner having been removed, however, which space makes it possible to push away any burrs which may be present on the moulds 2 or 3.

As is represented in detail in figure 5, this space 46 can be made such that there remains a hook-shaped material part 47 which can be easily bent. As material remains present in the corner itself, a correct positioning up into the corner is initially possible.

It should be noted that, in former days, the inside corner was always provided with a groove in the extension of the mitre joint, which is disadvantageous in that the sharp inside mitre side of the first mould in which the infeed corner piece 4 was provided, always ended up to deep in this groove. Thanks to the embodiment as described above, this disadvantage is excluded. For, the hook-shaped material part 47 offers enough resistance for a correct manual joining of the moulds 2 and 3, but it gives in under the large pressure as the whole is pressed and it bends away if there are any sawing burrs.

Further, a number of measures are preferably taken according to the invention while the corner joint is being

manufactured, which contribute to the correct formation of the corner and thus also to its rigidity. This will be explained hereafter, with reference to the accompanying figure 7 in which the pressing knives 48 for forming and pressing in the lips 13 are represented, as well as a counter block 49.

Since the introduction of the thermal interruption, there has been an additional problem related to the total mould section retaining its shape. Under the influence of the different forces which are exerted on the moulds 2-3, the thermal interruption, which usually has a rectangular shape when seen as a cross section, may start to deform, for example into a shape having the section of a parallelogram.

That is why the moulds 2-3 according to the invention will preferably be forced first to assume their correct section at the height of their future saw cut. This `forcing' takes place by providing for example supporting blocks around, or at least partially around the moulds 2-3, which blocks have a seating for the moulds 2-3 which follow the theoretically perfect design of the moulds 2-3. Also, the press-on elements, in particular press-on pistons, of the clamping device with which the moulds 2-3 are held in the sawing machine can possibly be provided with a seating which coincides with the pattern of the moulds 2-3.

Also during the actual pressing, as represented in figure 7, a number of special measures are preferably taken according to the invention.

First, a positioning is provided for by means of an adjusting fork 50. This adjusting fork 50 can be moved in a direction V in relation to the pressing knives 48, such that the corner formed by the moulds 2 and 3 can be

situated more or less deep between the pressing knives 48. The adjusting fork 50 is hereby set such that the short sides 20 of the notches 15 end up in the extension of the pressing knives 48. Depending on the thickness of the wall of the moulds 2-3 and the counterpressure of the counter block 49, the initially set distance will have to be lengthened or shortened somewhat by feel.

Usually, a few simple tests on dry-made test mitres, by which we mean that no locking pastes or such are used, will do in order to be able to process a specific series of moulds over a longer period. A good valuation can be made on the basis of the following two tests:

- By trying to push open the corner formed by the moulds 2-3. If the mitre joint 11 stays together, the corner joint is okay.
- By checking the short side 20. When it is somewhat scraped off after the pressing, this indicates that the corner joint 1 is sufficiently rigid.

For the counterblock 49 is preferably also used a block with a seating whose shape is adjusted to the shape of the mould, such that the moulds 2-3 are also forced to keep assuming their correct form during the pressing.

As far as the section and corner of the pressing knives 48 are concerned, it should be noted that wider lips 13 are to be preferred over narrow lips 13, whereas the angle of inclination is preferably selected on the basis of the elastic qualities of the material of the mould cylinder walls to be processed.

The stroke back and forth of the pressing knives 48 is preferably adjusted such that the end point of the movement

is situated such that, during the pressing, the mitre as a whole rebounds slightly on the counterblock 49. Then one can be sure that the bottom of the lips 13 is pressed perfectly against the stop surface 31 concerned.

Depending on the destination of the windows, the corner joints 1 will be protected in one or several places by means of a protective compound, paste, or such.

This protective compound may consist of a filler, for example polyurethane or glue, whereby this glue is essential, not as far as rigidity is concerned, but as far as sealing and bearing is concerned.

According to a first possibility, a filling compound may be provided beforehand in the above-mentioned notches 15 before shifting the infeed corner piece 4 in the cavities 9-10. Depending on the amount used, this filling compound offers one or several advantages. In the case of a small amount, possible cavities under lips 13 will be filled, so that no water can gather underneath it which might push the lips 13 outward in case of frost. If a somewhat larger amount is used, at least a part of the filler is driven out from under the lips 13 during the pressing and forced towards the sides thereof, so that the passages around the lips 13 are closed off, such that no water can penetrate in the moulds 2-3.

In case an even higher degree of protection is required, a filling compound will be preferably provided on top of the pressed-in lips 13 which is skimmed off evenly with the outer side of the moulds. In this manner, the notches 15 are entirely filled, so that also the unprotected aluminium around the lips 13 is protected against oxidation. This filling up is particularly appropriate for windows which

are placed in relatively aggressive environments, such as coastal areas and industrial areas.

According to yet another possibility, a filler can also be provided in the cavities 9-10, prior to the placing of the infeed corner piece 4. Thanks to the smooth, arrow-shaped design of the infeed parts 5 and 6, said filler will be optimally driven out to the most appropriate location, as indicated by reference 51 in figure 1. This technique makes it possible to partly relieve the lips 13, as the pressure transfer surface is enlarged. This is particularly appropriate for larger windows and heavy panes of glass.

Further, it is possible to apply a protective means with a very fine molecular structure on the mitre joint 11 itself for joining together the moulds 2 and 3, such that the mitre joint, in case the reveal surfaces of both moulds are not situated in a plane due to extrusion tolerances, are protected against oxidation.

The moulds 2-3 are themselves provided with a protective layer, such as lacquer or a layer of synthetic material, but it is clear that there is no such layer on the saw cut itself.

It is clear that this saw cut/oxidation coating may not contain any solvents which might affect the lacquer. Moreover, this oxidation coating has a structure which is fine enough in order to avoid that the product is driven entirely out of the mitre joint 11 under the pressure of both mould cylinders.

It should be noted that the invention is not restricted to infeed corner pieces 4 with infeed parts 5-6 which are

fixed to one another, but that, according to a variant, these infeed parts may also be adjusted at an angle. An example thereof is represented in figures 8 to 10.

The infeed parts 5 and 6 are hereby hinge-mounted to one another by means of a pivot 52. To this end, the far ends of these infeed parts 5 and 6 which are directed to one another are each provided with a hook-shaped part 53-54, with seatings 55-56 in which the pivot 52 is provided in a loose manner.

The one hook-shaped part 54 is made in the shape of a fork, as can be seen in figure 11, in between which the other hook-shaped part 53 is placed.

It should be noted that the infeed corner pieces 4, both in the embodiment of figures 1 to 7 and in the embodiment of figures 8 to 10 preferably consist of extruded pieces, in particular pieces which are made by cutting off parts of an extruded mould and which are finished if necessary.

The infeed corner piece 4 of figures 8 to 10 also differs from the one in figure 1 in that, instead of inwardly bent lips 13, use is made of conical drive-in pens 41 which are driven in. It is clear, however, that practically all other characteristics of the embodiment of figures 1 to 7 also apply in this case.

Thus, for example, in the case of conical drive-in pens, the recess 30 which loosens the material can be replaced by placing the openings as little central as possible, i.e. the openings in which the drive-in pens are provided in the direction of the top of the mitre as a whole, so that even here no material can be found anymore which could hinder

the pressing-on of the top of the arrow point to the inside of the mitre.

It is clear that also other locking means than the lips 13 or the drive-in pens 41 can be applied while still remaining within the scope of the invention.

It should be noted that when several infeed corner pieces are used which are to be pressed simultaneously (for example thermally interrupted moulds having several chambers in which such infeed corner pieces can be placed), it is utterly important that at least the design of the notches themselves is identical for the simultaneously carried out pressing to have the same optimal effect on the different infeed corner pieces.

The present invention is by no means limited to the above-described embodiments represented in the accompanying drawings; on the contrary, such a corner joint, the infeed corner piece used therefor and the above-mentioned method can be made in all sorts of variants while still remaining within the scope of the invention.

Claims.

1. Corner joint, in particular a corner joint (1) for cabinetwork which is made of hollow moulds (2-3), whereby this corner joint (1) has at least one infeed corner piece (4) with two infeed parts (5-6) extending at an angle which extend in the respective far ends of the moulds (2-3) to be joined, characterised in that it is provided with supplementary features which increase the resistance of this corner joint (1) and thus of the mitre as a whole against deformation.

2. Corner joint according to claim 1, characterised in that the supplementary features consist of the combination of at least the following characteristics:

- that the infeed corner piece (4) has a part (34) on at least one of the infeed parts (5-6) and preferably on both infeed parts (5-6) which extends through the cavity (9-10) of the accompanying mould (2-3) in an oblique manner as of the accompanying locking means (12) up to the opposite wall (33) of the cavity (9-10) in which the infeed corner piece (5-6) is situated, whereby this part (34) forms a support up to a place (P) which is situated significantly deeper in the cavity (9-10) than the above-mentioned locking means (12);
- that the infeed parts (5-6) are equipped with parts (40) which are joined together at an angle and which are each connected at their far ends to the above-mentioned accompanying oblique part (34), such that pressure created in the oblique parts (34) creates a tensile force in the first-mentioned parts (40);

- that the above-mentioned parts (40) which are joined together at an angle are situated against the inner wall (33) of the cavities (9-10) in which the infeed parts (5-6) are provided; and
- that the infeed parts (5-6) mainly have the shape of an arrow point split in the longitudinal direction, whereby the outer corner is predominantly free of any material, possibly to the exception of a number of elastically deformable positioning parts (43-45).

3. Corner joint according to claim 1 or 2, characterised in that the supplementary features consist of locking means (12) in the shape of upset material parts meshing in notches (15) in the infeed corner piece (4) as of a wall (14) of the moulds (2-3), whereby these material parts have one or several of the following characteristics:

- that an upsetting is applied which is close to the maximally admitted upsetting of the material, so as to allow for a safety margin;
- that the upsetting is selected such that it is nominally sufficiently large so as to compensate for the usual production tolerances and lacquer thicknesses on the produced semi-finished products that are taken as a basis; - that an upsetting is applied whose useful working force on the total mitre can only be increased by enlarging the deposit surface increase of the upset material parts.

4. Corner joint according to any of the preceding claims, characterised in that it is provided with locking means (12) consisting of upset material parts in the shape of lips (13) which are made by means of slantingly pressed-in parts of the moulds (2-3) and which co-operate with notches (15) in the infeed corner piece (4), and in that the

supplementary features consist of one or several notches (15) in the infeed corner pieces (4), whereby these notches (15) have one or several and preferably all of the following characteristics:

- that they are triangular;
- that they are triangular, whereby the side (19) against which the lip (13) concerned is situated is longer than the side (20) over which the free end of the lip (13) is pressed in;
- that they have the shape of a predominantly right-angled triangle, whereby the relation between the side (19) against which the lip (13) is situated and the side (20) over which the free end of the lip (13) is pressed in, is dictated by the compression characteristics of the material of the moulds;
- that the side (20) of the notches (15) over which the free end (21) of the lip (13) is pressed in has a concave bent and/or buckled shape;
- that the side (20) of the notches (15) over which the free end (21) of the lip (13) is pressed in, on the place where the free end (21) of this pressed-in lip (13) makes contact with said side (20) extends perpendicular or almost perpendicular to the longitudinal direction of the pressed-in lip (13);
- that the notches (15) have a depth of 3 to 4 mm.

5. Corner joint according to any of the preceding claims, characterised in that it is provided with locking means (12) consisting of one or several upset material parts in the shape of lips (13) which are made by means of slantingly pressed-in parts of the moulds (2-3), and in that the supplementary features consist at least of stop parts (23) which are situated behind the lips (13) and which allow for a pressing-on of the lips (13).

6. Corner joint according to claim 5, characterised in that this corner joint (1), and in particular the stop parts (23) have one or several of the following characteristics:

- the stop parts (23) extend in the prolongation (24) of the press-on direction (F);
- over the major part of their girth, the stop parts (23) are detached from the remaining structure of the infeed corner piece (4);
- the stop parts (23) are only connected to the rest of the infeed corner piece (4) at their base (25);
- in case of larger dimensions, the infeed corner piece (4) has a framed structure which is clearly recognisable, whereby the stop parts (23) are made thicker than the surrounding parts of the framed structure and/or are made equally thick as the total length of the pressed-in lip (13);
- near every stop part (23) concerned, the infeed parts (5-6) of the infeed corner piece (4) are provided with a recess (30) meant for storing any possible material which has been scraped off during the pressing in of the lips (13);
- every stop part (23) concerned is carried out in relief, preferably in the shape of a serration (32) on the surface against which the lip (13) concerned is pressed;
- the stop parts (23) have such a shape that the formation of any possible cavities under the pressed-in lips (13) is restricted and preferably excluded;
- every stop part (23) concerned has a stop surface (31) which is inclined in relation to the longitudinal direction of the accompanying mould (2-3), with an inclination which is preferably equivalent to the inclination of the pressed-in lip (13).

7. Corner joint according to any of claims 4, 5 or 6, characterised in that a filling compound is provided on the place of the pressed-in lips (13) in the shape of glue, synthetic material or such, whereby:

- this filling compound is either provided under the lip (13) so as to fill up any cavities under the lip (13);
- or this filling compound is provided in the passages around the lip (13), such that they are sealed off;
- or this filling compound is provided on the pressed-in lip (13) so as to entirely fill up the notch (15);
- or this filling compound provides for a combination of the above-mentioned functions.

8. Corner joint according to any of the preceding claims, characterised in that, before an infeed part (5-6) is placed in a cavity (9-10) of the accompanying profile (2-3), a filling compound in the shape of glue or such is provided in this cavity (9-10).

9. Corner joint according to any of the preceding claims, characterised in that it is provided with locking means (12) which operate on the outside of the moulds (2-3) concerned and which work in conjunction with the infeed corner piece (4), and in that the supplementary features at least consist in that the infeed corner piece (4) has a part (34) on at least one of the infeed parts (5-6), and preferably on both infeed parts (5-6), which extends slantingly through the cavity (9-10) of the accompanying mould (2-3) as of the accompanying locking means (12) up to the opposite wall (33) of the cavity (9-10) in which the infeed corner piece (4) is situated, whereby this part (34) forms a support up to a place where it is situated

significantly deeper in the cavity (9-10) than the above-mentioned locking means (12).

10. Corner joint according to claim 9, characterised in that it is part of a frame, of a window or a door, in which is provided a panel, in particular a pane of glass (16), which is fixed by means of wedges (17), characterised in that the wedges (17) are situated, preferably with their centre, in the extension (24) of the above-mentioned part (34).

11. Corner joint according to claim 9, characterised in that it is meant for a frame of a window or a door, in which a panel, in particular a pane of glass (16), is provided by fixing it by means of wedges (17), characterised in that the above-mentioned part (34) is directed such that the intersection (37) of the extension (24) thereof with the edge of the panel is situated on a distance (Z) from the corner of the panel which is in the order of magnitude of 10 cm.

12. Corner joint according to any of claims 9, 10 or 11, characterised in that the above-mentioned part (34) is made in the shape of a leg (26) which extends in the above-mentioned direction.

13. Corner joint according to any of claims 9 to 12, characterised in that the locking means (12) consist of lips (13) which are pressed in slantingly and thus provide for a tensile force, and in that these lips (13) are pressed in such that at least one of the following characteristics is met:

- the free end (21) of every lip (13) concerned is situated behind the central axis (39) of the above-mentioned part (34);
- every lip (13) concerned has a direction which is slightly buckled inward in relation to the direction of the above-mentioned part (34).

14. Corner joint according to any of claims 9 to 13, characterised in that the above-mentioned part is made in the shape of a leg (26) which is part of a triangle whose second leg (27) extends against the inside of the above-mentioned cavity (9-10) and whose third leg (29) forms a link between the first-mentioned leg (26) and the second leg (27).

15. Corner joint according to any of the preceding claims, characterised in that the supplementary features at least consist of the combination of parts (40) formed on the infeed parts (5-6) which join at an angle on the one hand, and means which make it possible to create a tensile force in these parts (40).

16. Corner joint according to claim 15 and any of claims 9 to 14, characterised in that the means which make it possible to create a tensile force in the above-mentioned parts (40) joining at an angle are formed of the above-mentioned oblique parts (34), which are connected to the above-mentioned parts (40) with their free ends, such that the pressure created in the oblique parts (34) creates a tensile force in the first-mentioned parts (40).

17. Corner joint according to claim 15 or 16, characterised in that the above-mentioned parts (40) are situated against the inner wall (33) of the respective cavities (9-10).

18. Corner joint according to any of the preceding claims, characterised in that the above-mentioned supplementary features at least consist in that the corner joint (1) is predominantly free of parallel surfaces between the infeed corner piece (4) and the outer wall (14) of the above-mentioned cavities (9-10), to the exception of any possible zones (D1) in which locking means are mounted.

19. Corner joint according to any of the preceding claims, characterised in that the above-mentioned supplementary features at least consist of a free space (42) formed on the outside corner of the infeed corner piece (4), in particular a space which is free of any massive material.

20. Corner joint according to any of the preceding claims, characterised in that the infeed corner piece (4) is provided with positioning elements to force it in the right position when it is placed in the cavities (9-10).

21. Corner joint according to claim 20, characterised in that the positioning elements consist of any of the following elements:

- elastic press-on means which push the infeed parts (5-6) with their inner sides against the inner wall (33) of the above-mentioned cavities (9-10) of the moulds (2-3);
- elastically bendable flaps (43) which are provided on the infeed parts (5-6) at a distance from the corner point and which work in conjunction with the outer wall (14) of the cavities (9-10);
- support and guiding elements on the corner point, preferably in the shape of a little leg (44), provided with elastically bendable flaps (45) which work in

conjunction with the outer wall (14) of the cavities (9-10) respectively.

22. Corner joint according to any of the preceding claims, characterised in that the above-mentioned supplementary features at least consist of a space (46) provided in the material of the infeed corner piece (4), right behind the inside corner, without any removal of the material part (47) of the inside corner, however, which space makes it possible to push away any burrs which may be present on the moulds, whereby the above-mentioned material part is then deformed.

23. Corner joint according to any of the preceding claims, characterised in that the infeed corner piece (4) has infeed parts (5-6) made in one piece.

24. Corner joint according to any of claims 1 to 22, characterised in that the infeed parts (5-6) are hinge-mounted in their corner point.

25. Corner joint according to claim 24, characterised in that the infeed parts (5-6) are made hook-shaped on their co-operating far ends and are connected to one another by means of a pivot (52).

26. Corner joint according to any of the preceding claims, characterised in that the above-mentioned supplementary features consist of the right adjustment and/or positioning and/or combination of several of the components, such as the result of one or several measures which are taken during the manufacturing process of the corner joint (1).

27. Infeed corner piece for realising a corner joint according to any of the preceding claims, characterised in

that this infeed corner piece (4) has one or several of the characteristics which are described in the preceding claim in relation to this infeed corner piece (4).

28. Method for realising a corner joint according to claim 26, characterised in that it includes one or several of the following steps:

- the use of means which force the moulds (2-3) to assume their theoretically perfect shape before and/or after the mitre-sawing;
- in case locking means (12) are used in the shape of inwardly bent lips (13) which are formed by pressing them in, the use of means which force the moulds (2-3) to assume their perfect shape;
- in case locking means (12) are used in the shape of inwardly bent lips (13) which are formed by pressing them in, the adjustment of the end point of the movement of the pressing knives (48), such that during the pressing, the mitre as a whole rebounds slightly.
- in case locking means (12) are used in the shape of inwardly bent lips (13) which are formed by pressing them in, the application of a filling compound or such in the notch (15) in which the lips (13) are provided, in such an amount that it is at least partially driven out during the pressing, and such that a sealing is formed on these openings, next to the lip (13).

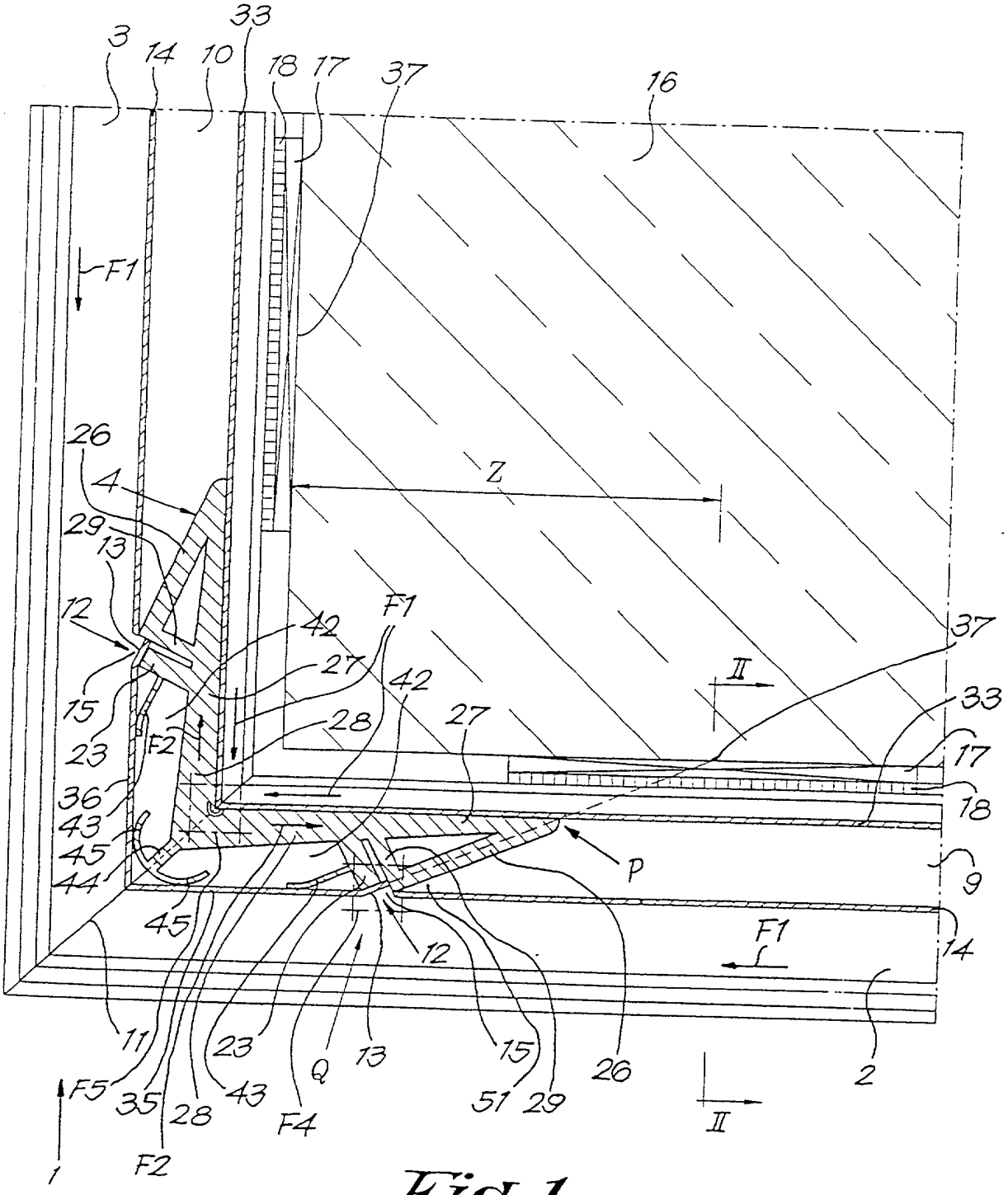
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Fig. 1

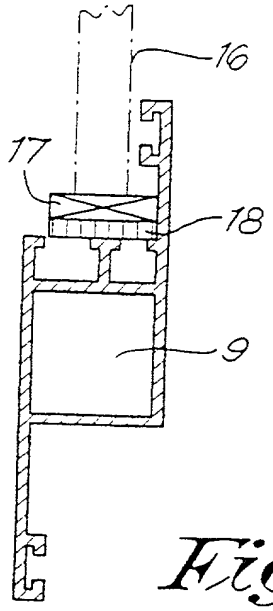

Fig.2

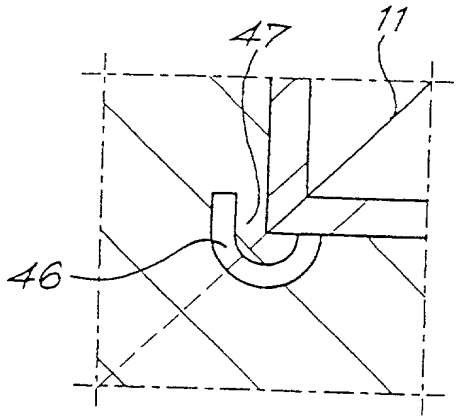

Fig.5

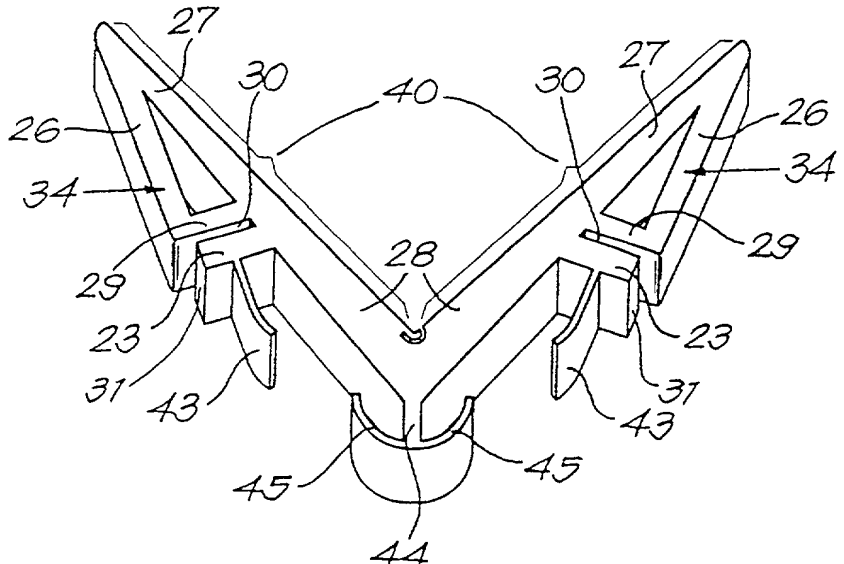

Fig.6

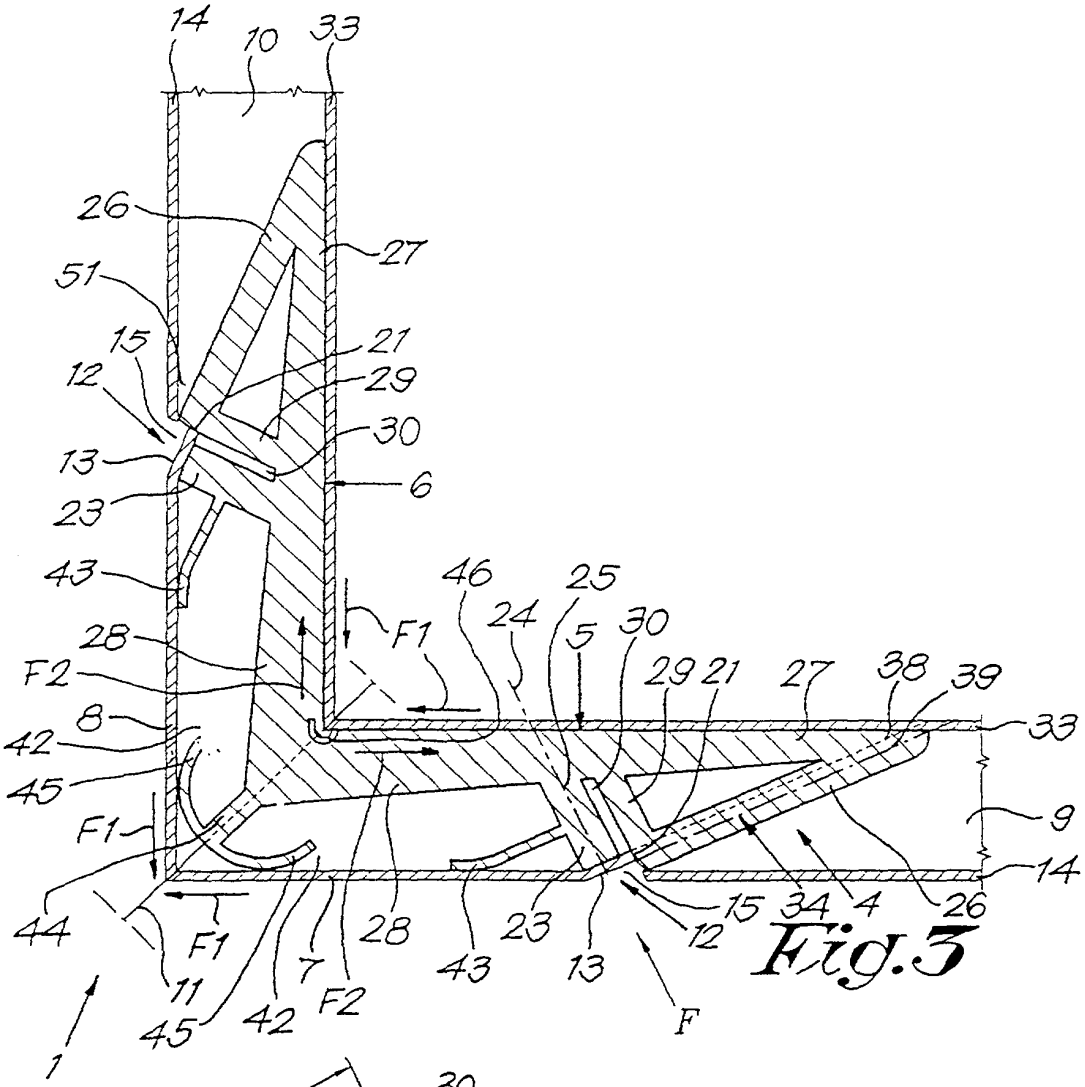
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Fig.3

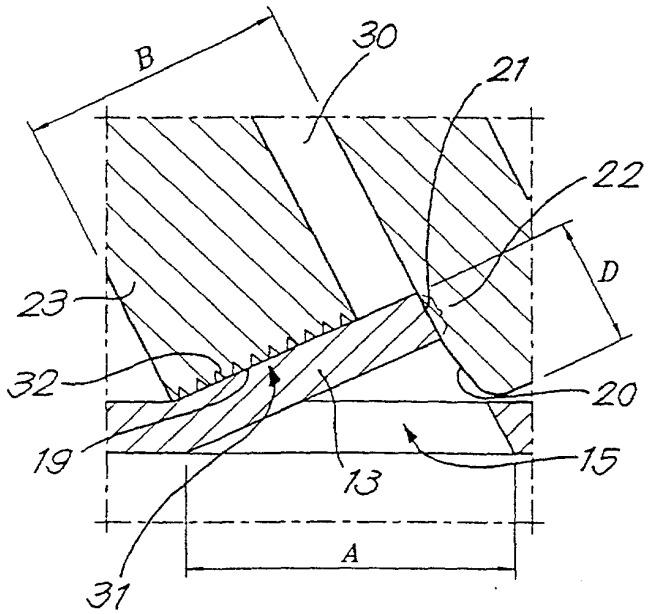
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Fig.4

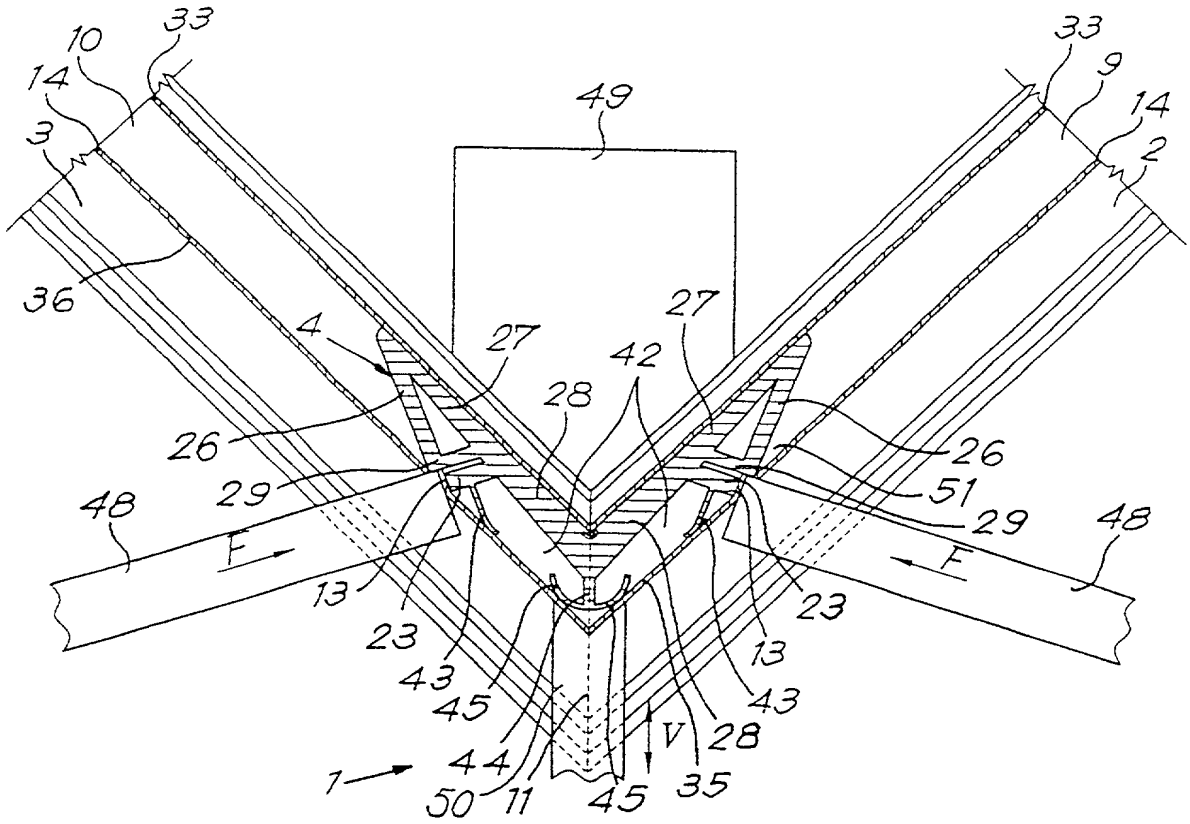
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Fig.7

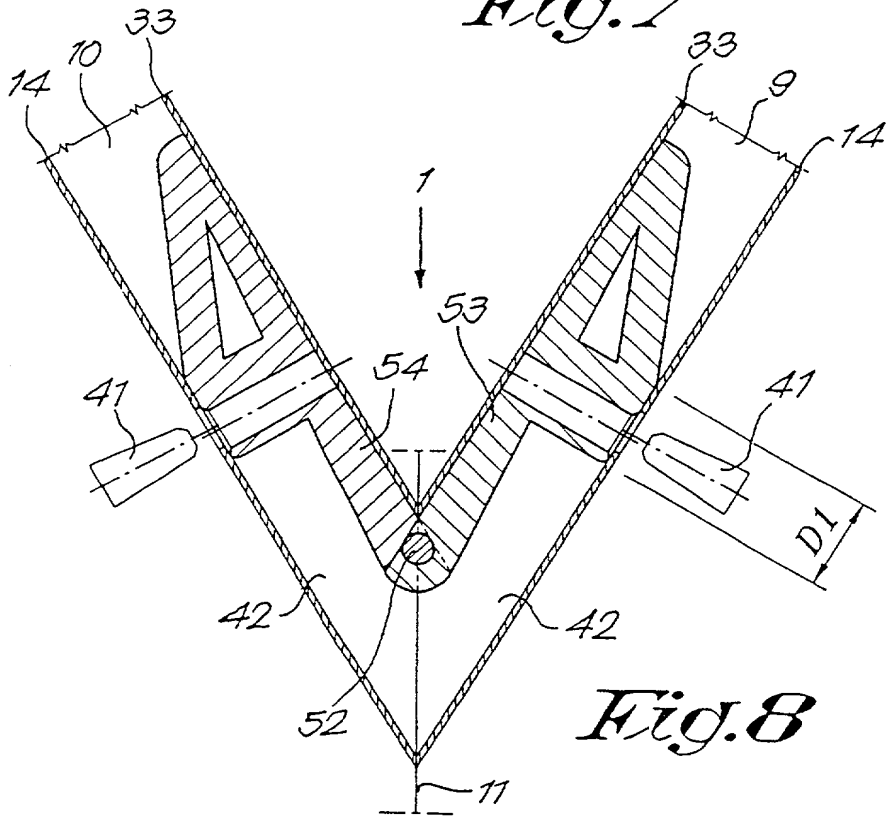
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Fig.8

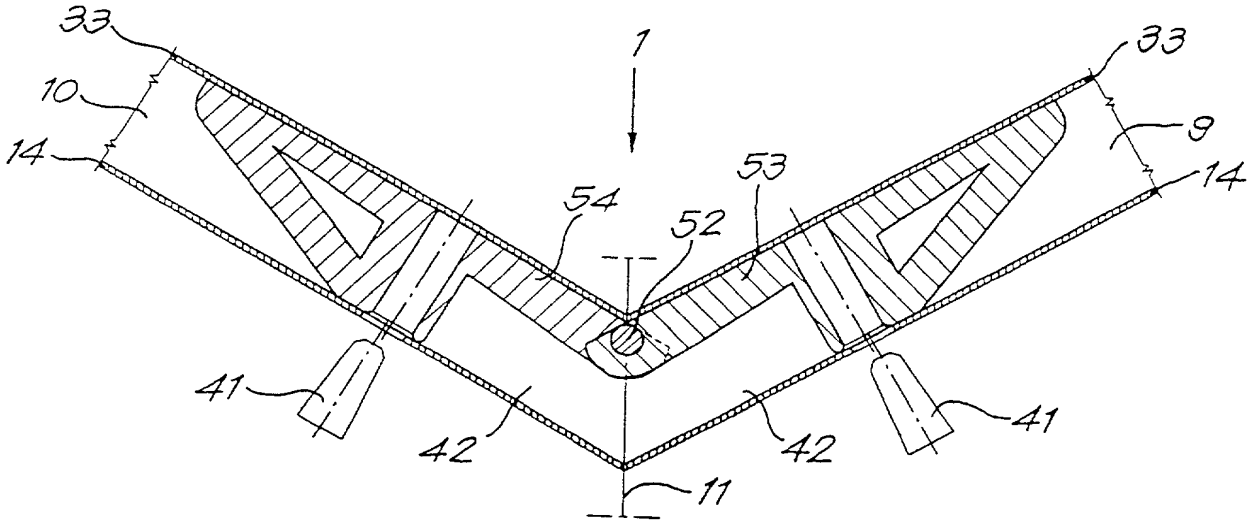

Fig.9

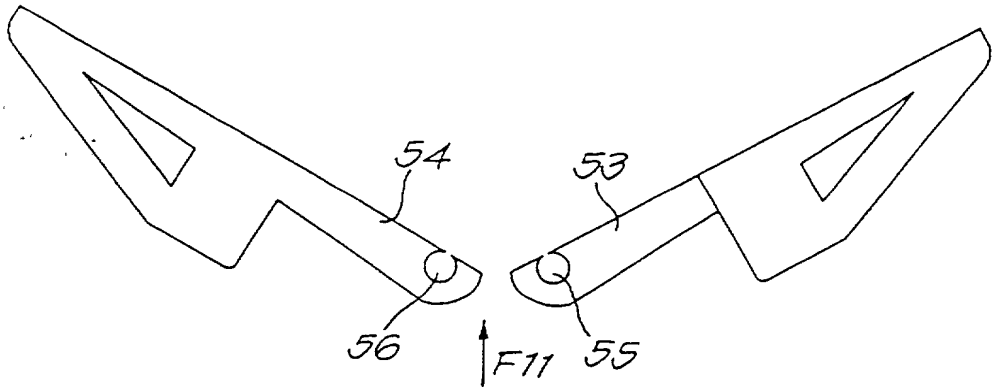

Fig.10

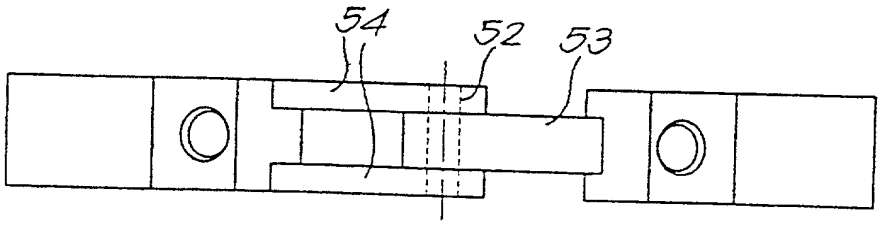

Fig.11

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PATENT TRADEMARK OFFICE

Attorney/Docket No. _____

DECLARATION FOR PATENT APPLICATION
AND APPOINTMENT OF ATTORNEY

As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name; I believe that I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention (Design, if applicable) entitled "Corner joint and method for making such a corner joint, as well as infeed corner pieces to realise such a corner joint".

the specification of which (check one): [ ] is attacned hereto; [ ] was filed on _____ as Application Serial No. _____ and was amended on (or amended through) _____ (if applicable); was filed as International Application (PCT) No. PCT/BE99/00123 and amended on 28/09/1999 (if applicable). I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment(s) referred to above. I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a). I hereby claim foreign priority benefits under Title 35, United States Code §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)			Priority Claimed	
9800695	Belgium	29/09/1998	[X]	[ ]
(Number)	(Country)	(Day/Month/Year Filed)	Yes	No
9900041	Belgium	21/01/1999	[X]	[ ]
(Number)	(Country)	(Day/Month/Year Filed)	Yes	No
			[ ]	[ ]
(Number)	(Country)	(Day/Month/Year Filed)	Yes	No
			[ ]	[ ]
(Number)	(Country)	(Day/Month/Year Filed)	Yes	No

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Appln. SN)	(Filing Date)	(Status - Patented, Pending or Abandoned)
(Appln. SN)	(Filing Date)	(Status - Patented, Pending or Abandoned)

I HEREBY DECLARE THAT ALL STATEMENTS MADE HEREIN OF MY OWN KNOWLEDGE ARE TRUE AND THAT ALL STATEMENTS MADE ON INFORMATION AND BELIEF ARE BELIEVED TO BE TRUE; AND FURTHER THAT THESE STATEMENTS WERE MADE WITH THE KNOWLEDGE THAT WILLFUL FALSE STATEMENTS AND THE LIKE SO MADE ARE PUNISHABLE BY FINE OR IMPRISONMENT, OR BOTH, UNDER SECTION 1001 OF TITLE 18 OF THE UNITED STATES CODE AND THAT SUCH WILLFUL FALSE STATEMENTS MAY JEOPARDIZE THE VALIDITY OF THE APPLICATION OR ANY PATENT ISSUED THEREON.

DECLARATION FOR PATENT APPLICATION
AND APPOINTMENT OF ATTORNEY

Attorney/Docket No. _____

POWER OF ATTORNEY: I (We) hereby appoint as my (our) attorneys, with full powers of substitution and revocation, to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: J. Ernest Kenney, Reg. No. 19,179; Eugene Mar, Reg. No. 25,893; Richard E. Fichter, Reg. No. 26,382; Charles R. Wolfe, Jr., Reg. No. 28,680; Bruce H. Troxell, Reg. No. 26,592; Thomas J. Moore, Reg. No. 28,974;

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Belgium	Belgium
Date	Signature
27/03/2001	

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Date	Signature

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City	City
State or Country Zip	State or Country Zip
Date	Signature

(See following page(s) for additional joint inventors)